CLAIMS

1.   An apparatus for automatically inspecting vehicles being driven into a first area, the apparatus comprising:

imaging means for capturing an image of an undercarriage of a vehicle as the vehicle is being driven into the first area;

database means for storing images of undercarriages of vehicles which are permitted into the first area; and

means for comparing the captured image of the undercarriage of the vehicle being driven into the first area with at least one of the stored images of the undercarriages of vehicles in the database means.

2.   The apparatus according to claim 1, wherein the imaging means comprises an area-scan camera for capturing a series of images of different areas of the undercarriage of the vehicle; and

means for stitching the series of images of different areas of the undercarriage, to form a composite undercarriage image.

3.   The apparatus according to claim 2, wherein individual images of the series of images are overlapping images.

4.   The apparatus according to claim 2, wherein the composite undercarriage image is a complete undercarriage image.

5.   The apparatus according to claim 1, wherein the database means further stores vehicle identification data of vehicles permitted into the first area in association with the images of the undercarriages of those vehicles.

6.   The apparatus according to claim 5, further comprising:

means for inputting an identification of a vehicle being driven into the first area; and wherein

the means for comparing is operable to compare the captured image of the undercarriage of the vehicle with at least one of the stored images associated with the

identification of the vehicle being driven into the first area and to highlight discrepancies therebetween.

7.   The apparatus according to claim 6, further comprising means for triggering an alerting mechanism when the means for comparing highlights discrepancies.

8.   The apparatus according to claim 6, wherein the means for inputting an identification of a vehicle comprises means for reading an identification number on the vehicle.

9.   The apparatus according to claim 8, wherein the means for reading comprises number plate recognition means for reading a number on a vehicle number plate.

10.   The apparatus according to claim 1, wherein the database means further contains driver identification data of drivers permitted to drive vehicles into the first area.

11.   The apparatus according to claim 10, wherein the database means associates the driver identification data with at least one vehicle that individual drivers are permitted to drive into the first area.

12.   The apparatus according to claim 11, further comprising:
        means for inputting driver identification data of the driver of a vehicle being driven into the first area; and wherein
        the means for comparing is operable to compare input driver identification data with driver identification data contained in the database to determine whether the driver is permitted into the first area.

13.   The apparatus according to claim 12, wherein the means for comparing is further operable to compare identification data of a current vehicle being driven into the first area with driver identification data contained in the database to determine whether the driver is permitted to drive the current vehicle into the first area.

14.   An apparatus for automatically inspecting a vehicle being driven into a first area, the apparatus comprising:

database means containing:

driver identification data identifying drivers who are permitted to drive vehicles into the first area;

number plate data identifying vehicles which are permitted into the first area; and

data identifying which driver is permitted to bring which vehicle into the secure site;

means for capturing identification data about a driver who is driving the vehicle into the first area;

number plate recognition means for capturing number plate data about the vehicle being driven into the first area; and

means for interrogating the database means based on the captured identification data about the driver who is driving the vehicle into the first area and based on the captured number plate data to determine whether the driver is permitted to drive the vehicle into the first area.

15.   The apparatus according to claim 12, wherein the means for inputting driver identification data comprises means for capturing identification data about the driver.

16.   The apparatus according to claim 14, wherein the driver identification data for a driver comprises information from a personal identification card.

17.   The apparatus according to claim 14, wherein the means for capturing identification data about a driver is operable to capture data from a driver's personal identification card.

18.   The apparatus according to claim 14, wherein the driver identification data for a driver comprises biometrics data of the driver.

19.   The apparatus according to claim 18, wherein the biometrics data identifying drivers who are permitted to drive vehicles into the first area comprises at least one of:

a facial image of each such driver;

a print of at least a portion of a hand of each such driver;

an eye scan of each such driver; and

voice data of each such driver.

20.   The apparatus according to claim 18, wherein the means for capturing identification data about a driver is operable to capture driver biometrics data.

21.   The apparatus according to claim 14, wherein:

the means for capturing identification data comprises means for detecting physiological data about the driver who is driving the vehicle; and further comprising:

means for inferring, from the detected physiological data, information about a current psychological profile of the driver; and

means for triggering an alerting mechanism when the inferred current psychological profile of the driver matches specified criteria.

22.   The apparatus as claimed in claim 21, in which the specified criteria include a stress level of the driver.

23.   The apparatus as claimed in claim 21, in which the physiological data includes data about at least one of a pulse rate and voice characteristic data of the driver.

24.   The apparatus as claimed in claim 23, in which:

the apparatus further includes means for storing at least one of base-line pulse rate data and voice characteristic data about the driver; and

the means for inferring the current psychological profile of the driver from the detected physiological data includes means for comparing at least one of the detected pulse rate of the driver with the base-line pulse rate data for the driver, and the detected voice characteristic of the driver with the stored voice characteristic data for the driver.

25.   The apparatus as claimed in claim 15, in which the apparatus is arranged in three zones, comprising:

an identification and psychological profiling zone, in which the means for capturing identification data about the driver is located;

an automatic inspection zone, in which the imaging means for capturing an image of the undercarriage of the vehicle is located; and

a manual inspection zone.

26.   The apparatus as claimed in claim 25, further comprising means, under control of the apparatus, for selectively preventing and allowing movement of the vehicle from the identification and psychological profiling zone into the automatic inspection zone.

27.   The apparatus as claimed in claim 25, further comprising means, under control of the apparatus, for selectively preventing and allowing movement of the vehicle from the automatic inspection zone into the manual inspection zone.

28.   The apparatus as claimed in claim 25, further comprising means, under control of the apparatus, for selectively preventing and allowing movement of the vehicle from the manual inspection zone into the first area.

29.   The apparatus as claimed in claim 25 in which components of the apparatus that are located in at least one of:

the identification and psychological profiling zone;

the automatic inspection zone; and

the manual inspection zone,

are hardened against the effects of explosive blast.

30.   The apparatus as claimed in claim 14, wherein the number plate recognition means includes a number plate recognition camera.

31.   The apparatus as claimed in claim 25, further comprising a number plate recognition camera for capturing number plate data about the vehicle being driven into the first area; and wherein

the vehicle is visible to the number plate recognition camera on entry of the vehicle into the identification and psychological profiling zone; and

on detection by the number plate recognition camera of the vehicle entering into the identification and psychological profiling zone, the number plate recognition camera is triggered to capture number plate data about the vehicle.

32.   The apparatus as claimed in claim 14, further comprising means for detecting a presence of explosives associated with the vehicle that is being driven into the first area.

33.   The apparatus according to claim 25, further comprising means for detecting a presence of explosives associated with the vehicle that is being driven into the first area located in at least one of the automatic inspection zone and the manual inspection zone.

34.   The apparatus as claimed in claim 33, wherein the means for detecting the presence of explosives include at least one of portable explosives detection devices and a detecting portal through which the vehicle is driven.

35.   The apparatus according to claim 1, wherein the vehicle is a motor vehicle.

36.   The apparatus according to claim 1, wherein the first area is a secure site.

37.   A vehicle access control system comprising a plurality of apparatuses for automatically inspecting vehicles being driven into different first areas, wherein
        the apparatuses are networked together; and
        each apparatus comprises:
                imaging means for capturing an image of an undercarriage of a vehicle as the vehicle is being driven into the respective first area;
                database means for storing images of undercarriages of vehicles which are permitted into the respective first area; and
                means for comparing the captured image of the undercarriage of the vehicle being driven into the respective first area with at least one of the stored images of the undercarriages of vehicles on the database means.

38.   A method for automatically inspecting a vehicle being driven into a first area, the method comprising:

capturing an image of an undercarriage of the vehicle as the vehicle is being driven into the first area; and

comparing the captured image of the undercarriage of the vehicle being driven into the first area with at least one stored image of undercarriages of vehicles which are permitted into the first area.

39.   The method according to claim 38, wherein the capturing step comprises:

capturing a series of overlapping images of different areas of the undercarriage of the vehicle; and

stitching the series of images of different areas of the undercarriage, to form a composite complete undercarriage image.

40.   The method according to claim 38, further comprising:

inputting an identification of a vehicle being driven into the first area;

comparing the captured image of the undercarriage of the vehicle with at least one stored image associated with the identification of the vehicle being driven into the first area;

highlighting if there are discrepancies between the compared captured image and at least one stored image; and

triggering an alert when a discrepancy is determined.

41.   The method according to claim 40, wherein inputting an identification of a vehicle comprises reading an identification number on a vehicle number plate.

42.   The method according to claim 38, further comprising:

capturing driver identification data of a driver of a current vehicle being driven into the first area;

comparing input driver identification data with driver identification data of drivers permitted to drive vehicles into the first area to determine whether the driver is permitted into the first area; and

comparing identification data of the current vehicle being driven into the first area with driver identification data to determine whether the driver is permitted to drive the current vehicle into the first area.

43.   A method for automatically inspecting a vehicle being driven into a first area, the method comprising:

capturing identification data about a driver who is driving the vehicle into the first area;

reading a number on a vehicle number plate of the vehicle being driven into the first area; and

based on captured identification data about the driver who is driving the vehicle into the first area, captured number plate data, and driver identification data identifying drivers who are permitted to drive vehicles into the first area, determining whether the driver is permitted to drive the vehicle into the first area.

44.   The method according to claim 42, wherein capturing identification data about a driver comprises capturing data from a personal identification card.

45.   The method according to claim 43, wherein capturing identification data about a driver comprises capturing biometrics data from the driver comprising at least one of:

a facial image of each such driver;

a print of at least a portion of a hand of each such driver;

an eye scan of each such driver; and

voice data of each such driver.

46.   The method according to claim 43, wherein:

capturing identification data comprises detecting physiological data about the driver who is driving the vehicle; and further comprising:

inferring, from the detected physiological data, information about a current psychological profile of the driver; and

triggering an alerting mechanism when the inferred current psychological profile of the driver matches specified criteria.

47.   The method as claimed in claim 46, in which the specified criteria include a stress level of the driver.

48.   The method as claimed in claim 46, wherein:

the physiological data includes data about either or both of the pulse rate and voice characteristic data of the driver; and

wherein inferring the current psychological profile of the driver from the detected physiological data includes comparing at least one of the detected pulse rate of the driver with a stored base-line pulse rate data for the driver, and the detected voice characteristic of the driver with a stored voice characteristic data for the driver.

49.   The method as claimed in claim 42, wherein:

capturing identification data about the driver takes place when the vehicle is in an identification and psychological profiling zone;

capturing an image of the undercarriage of the vehicle takes place when the vehicle is in an automatic inspection zone; and

a number on a vehicle number plate is read when the vehicle is detected entering into the identification and psychological profiling zone; and

further comprising detecting the vehicle entering into the identification and psychological profiling zone.

50.   The method as claimed in claim 49, further comprising selectively preventing and allowing movement of the vehicle from at least one of:

the identification and psychological profiling zone into the automatic inspection zone;

the automatic inspection zone into a manual inspection zone; and

the manual inspection zone into the first area.

51.   The method as claimed in claim 38, further comprising detecting a presence of explosives associated with the vehicle that is being driven into the first area.

52.   A method of controlling vehicular access to a first area having at least one entrance with a plurality of inspection zones, each inspection zone being contiguous with at least one other inspection zone and at least one inspection zone being contiguous with a secure site, the method comprising:

permitting a driver to bring a vehicle attempting access to the first area to enter into a first one of the inspection zones;

conducting at least one inspection process on the vehicle in the first inspection zone;

wherein allowable outcomes of the at least one inspection process in the first inspection zone comprise:

(i) the vehicle failing the at least one inspection process and:

(a) the vehicle not being permitted to move out of the first inspection zone; or

(b) the vehicle being allowed to leave without proceeding into the first area; and

(ii) the vehicle passing the at least one the inspection process and being permitted to move out of the first inspection zone into a second one of the inspection zones; and

if the vehicle has entered the second inspection zone conducting at least one other inspection process on the vehicle in the second inspection zone;

wherein allowable outcomes of the at least one other inspection process in the second inspection zone comprise:

(iii) the vehicle failing the at least one inspection process and:

(c) the vehicle not being permitted to move out of the second inspection zone; or

(d) the vehicle being allowed to leave without proceeding into the first area; and

(iv) the vehicle passing the at least one other inspection process and being permitted to move out of the second inspection zone.

53.   The method as claimed in claim 52, wherein one of the first and second inspection zones is an identification and psychological profiling zone in which at least one of the following categories of data is captured:

biometric data about the driver;

image data about the driver; and

image data about a number plate of the vehicle.

54. The method as claimed in claim 53, wherein the other one of the first and second inspection zones is an automated inspection zone contiguous with the identification and psychological profiling zone, the automated inspection zone including at least one of:

an explosives detection portal for chemically detecting explosives associated with a vehicle; and

an apparatus for capturing an image of an undercarriage of a vehicle.